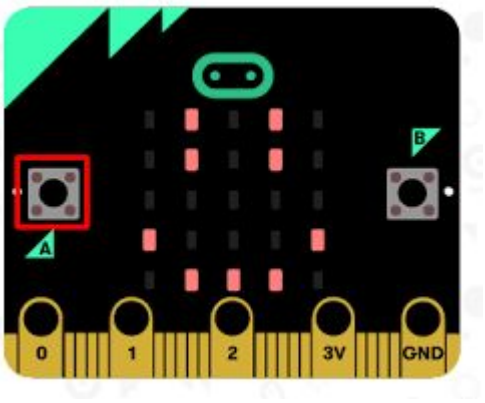
Mission Heights Junior College - Year 8 STEM



Design Assignment – Micro:bit

Situation:

Your Whanau context for term 1 is - **Our Evolving Community**. In your STEM Technology class you have been learning to use a Micro:bit which is a pocket sized computer that can be used to control many different electronic based systems by using circuits and coding.

Design Brief : Our Evolving Community

As a member of both your home and school community you are required to design a device that focuses on your personal space in your community.
Your task is to use your Micro:bit to design and manufacture a prototype device which will alert yourself or others when they are entering the space in your community.

Your project will have a Micro:bit as its main processor and it will have to be designed and manufactured to meet the given design specifications. You can decide whether your prototype will be designed for use by yourself, by your family or your friends. Your prototype can be designed for use at either home or school.

Design Specifications

The completed project must meet these design specifications:

- Must use a BBC Micro:bit as its main processor (the processor is the main controller)
- Must use a battery to power the Micro:bit and make the project self contained
- The battery is to be easily accessible for changing
- The project will have an input (which can be switch or light based) and an output (which can be light, sound or a combination of light and sound)

Design work and assessment:

You will need to follow the design process to produce a prototype of your project which will be then assessed. The design process is just a way of designing and developing an idea by making a prototype that can then be used to show that your idea can work before it goes into production, all products are developed this way.

Your work will be divided into four sections, each section will be completed in turn. The sections are shown below, after this there are details of what you need to do to complete each section, this is where you provide evidence of your design work and the development of your prototype. by using photos, screenshots and text.

Section 1 - Design Brief
A design brief is an outline of what you intend to do to produce your prototype, a design brief contains details of;

- The situation (a description of what you intend to do)
- Your stakeholder. This is someone who will be involved in your project, they can be a person who you are designing your prototype for or someone who will be used to give feedback on your prototype. The stakeholder cannot be yourself.
- The design specifications that your prototype must meet when it is completed

Section 2 - Possible Solutions
In this section you will look at some possible ideas for your project. You will brainstorm some possible solutions for your project, then select the best idea which meets the design specifications, taking into consideration the needs and opinions of your stakeholder.

Section 3 - Development of your prototype solution
In this section you develop your chosen design idea into a prototype solution using your micro:bit, electronic components and coding. As you develop your prototype you will take photos and screenshots which you will then use in your slides to show your progress.
Depending on your progress, after the prototype has been developed using your micro:bit and bread board you may be able to produce a working model of your solution, this will depend on your progress and the time available.

Section 4 - An evaluation of your completed prototype
The final part of the design process is to evaluate your prototype to determine how it has met the design specifications and possible ways it could be improved upon.

Sections of work in detail:
This is a breakdown of what is needed to complete each section of work. To begin your work you will need to begin a new slide show, you will use these slides to record your evidence for assessment, you will have access to some example slides that show how to layout your work.
Example slides

Make a new slide show, the title is - **STEM Technology - Micro:bit Design**

Slide one, heading:
Section 1 - Design Brief
On this slide you will have: your name, your class and the design brief which you can copy and paste using the paragraph below (from the Design Brief down to Section Two)

Design Brief : Our Evolving Community

As a member of both my home and school community I am required to design a device that focuses on a personal space in my community.
My task is to use a Micro:bit to design and manufacture a prototype device which will alert myself or others when they are entering the space in a chosen community.

My prototype will have a Micro:bit as its main processor and it will have to be designed and manufactured to meet the given design specifications. The prototype will be designed for use either by myself, my family or friends. My prototype can be designed for use at either home or school.

State who is your main stakeholder.
Your stakeholder (someone who will be involved in your project) can be a person who you are designing your prototype for or someone who will be used to give feedback on your prototype. The stakeholder cannot be yourself.
The main stakeholder for my project is (enter the details of this person)

The design specifications that my prototype must meet when it is completed are:

- Must use a BBC Micro:bit as its main processor (the processor is the main controller)
- Must use a battery to power the Micro:bit and make the project self contained
- The battery is to be easily accessible for changing
- The project will have an input (which can be a switch or light based) and an output (which can be light, sound or a combination of light and sound)

Slide two, heading:
Section 2 - Possible Solutions
In this section you will look at some possible ideas for your project. You will brainstorm some possible solutions for your project, then select the best idea which meets the design specifications, taking into consideration the needs and opinions of your stakeholder. The best way to look at possible ideas is to use sheets of paper and a pencil to brainstorm, use a bubble map to record as many ideas as you can then refine these ideas to decide on a final idea which can be developed into a prototype.
You can scan the sheets and include the scans in your slides.

Slide(s) three, heading:
Section 3 - Development of your prototype solution
In this section you develop your prototype solution using your micro:bit, the micro:bit breadboard, electronic components and coding. As you develop your prototype you will take photos and screenshots which you will then use in your slides to show your progress.
Depending on your progress, after the prototype has been developed using your micro:bit and bread board you may be able to produce a working model of your solution, this will depend on your progress and the time available.

Slide four, heading:
Section 4 - Evaluation of the prototype
This is the final part of the design process where you evaluate your completed prototype to determine how has it met the design specifications, what are the opinions of your main stakeholder and how it could it be improved upon.

The evaluation can be done using a table format with the evaluation points down the left side and the responses to the right (see the example table below)

Your evaluation layout should be completed in this way;
1/ Include a photo (as many as you need to fully show your prototype) of the completed prototype also, if you completed a functioning model you must have a photo(s) of this.

2/ A brief description of the prototype (use these subheadings)

- how it works
- where it is intended to be used
- who would be the main user

3/ A table with the evaluation points and brief comments

Example evaluation table:

Project Evaluation	
Design Specifications	Evaluation of how your project met the design specifications
Stakeholder feedback	Comments from your main stakeholder, how does the product meet the needs of your main stakeholder?
Problems Encountered	Comments on the problems you faced whilst designing/making
Overcoming Problems	Comments on how you overcame with problems
Next Time	Comments on what you would do differently if you had the chance or on your next design project

Assessment:

Your work will be assessed using this rubric:

Working Towards - You have not completed the slides containing the design work which must include the design brief, possible solutions, development and evaluation.
Working at - You have completed the slides containing the design work which must include the design brief, possible solutions, development and evaluation.
Working above - You have completed the slides (as per achieved) and you have completed a functioning prototype using a breadboard.
Working beyond - You have completed the slides (as per merit) and you have completed a functioning model of your prototype.

Working Towards	Has **not** completed the design work which must include the design brief, possible solutions, development and evaluation	
Working At	Has completed the design work which must include the design brief, possible solutions, development and evaluation	
Working Above	Has completed the design work (as per achieved) and has evidence of a functioning prototype	
Working Beyond	Has completed the design work (as per achieved) and has evidence of a functioning prototype and also a working model	